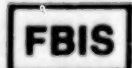


JPRS-TND-87-008

8 APRIL 1987

Worldwide Report

**NUCLEAR DEVELOPMENT
AND
PROLIFERATION**



FOREIGN BROADCAST INFORMATION SERVICE

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8 APRIL 1987

WORLDWIDE REPORT
NUCLEAR DEVELOPMENT AND PROLIFERATION

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BRIEFS

NUCLEAR PLANT TRAINEES IN GDR--Following the successful completion of work on repairing nuclear power plant equipment in the GDR and completion of training at the Central Institute for Welding in Halle, a group of specialists from the "Montaza" work organization within the "Djuro Djakovic" enterprise have received licenses for engineers in quality welding and for instructors in welding. Preparations are being made for another group of mechanics and welders to work on nuclear power plants in the GDR, so the "Montaza" group will be fully trained with international certification for work on nuclear power plants in East Germany. With these licenses the "Montaza" specialists have acquired the right to test and train welders from other work organizations in Yugoslavia for work on traditional nuclear plants and nuclear power plants in the GDR. [Excerpt] [Belgrade EKONOMSKA POLITIKA in Serbo-Croatian 2 Mar 87 p 33] /6662

CSO: 5100/3009

CONTINUED DEBATE, COMMENTARY ON PROPOSED NUCLEAR DUMP

Editorial Calls for Answers

Buenos Aires LA PRENSA in Spanish 5 Feb 87 p 6

[Editorial entitled: "A Nuclear Dump"]

[Text] A national deputy from Chubut has filed a motion with the Chamber of Deputies asking that the chamber request the executive to arrange for a plebiscite to be held in Chubut province, so that the people may express their views on the siting of a "nuclear dump" in the Gastre area. The deputy said that a public information program should be conducted, culminating in a referendum. He added that as a legislator he feels that "the possibility that a nuclear storage facility located in Argentina might become a nuclear dumping ground for other countries can never be accepted, for that would constitute a breach of our sovereignty." In support of his initiative, he said that the natural resources expert, Mirta Laciari, feels that public opinion should be warned of nuclear risks, for "this lack of information is not reasonable; the wastes will remain radioactive for 20,000 years. And that is why countries all over the world are having problems in deciding where to put their nuclear wastes."

This legislative proposal calls for several comments. In the first place, it seeks to bypass the constitution, which recognizes neither "plebiscites" nor popular referendums. In fact, article 22 of the constitution states that "the people do not deliberate or govern except through their representatives." Moreover, from a legal point of view, the central government is empowered to decide on the use of lands owned by the national government which, as such, belong to the entire nation. This does not mean that the executive can act entirely on its own, since the significance of this initiative does call for a decision by congress. The position of the author of the bill is reasonable, in the sense that there should be an information campaign, for the authorities are required to report to the nation about their proposals and plans on behalf of the republic's general interests. It is appropriate to point out here that there have been repeated news reports on this issue. On 11 April 1979, it was reported in Bern that Argentina was willing to take

change of Switzerland's radioactive wastes in exchange for a heavy water plant to be built in Arroyito (Neuquen), contracted by the military government. It was stated that while this information was known in the Swiss capital, the Zurich newspaper, *TAGES-ANZEIGER*, spread it all over the country, and also that Argentine delegates had held talks with the National Cooperative for Nuclear Waste Storage and the office for energy conservation. The head of that office, Eduard Kiener, said that, in exchange for the heavy water plant, Argentina proposed to take Switzerland's stockpiled radioactive wastes. The contract for the heavy water plant, with a production capacity of 250 tons a year, was signed in Arroyito on 14 May 1980. On 7 October 1982 Argentina's undersecretary for the environment said it had been decided that the "nuclear dump" would be located in Gastre.

On 28 September 1986, the radiological protection and safety director of the CNEA [National Atomic Energy Commission], engineer Elias Palacios, confirmed that the government had decided to build a storage facility for nuclear wastes in Gastre, which would cost from \$300 to \$500 million. He said that "at no time was there any idea of building a storage facility for other (foreign) nuclear centers." On 30 September, the president of the Engineers, Architects and Surveyors Center of Comodoro Rivadavia, Hernando Crespo, reported that "the CNEA staff did consider the possibility of leasing the Gastre storage site for international wastes." On the same date, the CNEA stated that "the final decision on this matter will be made by the national executive." With all these contradictory reports, the authorities will have to provide definite and detailed information on the selection of Gastre as a site for the "nuclear dump," and on whether there is indeed any agreement or intention of using it to store foreign nuclear wastes. For it would seem that the persons who handle nuclear waste disposal in other countries believe that keeping those wastes in their own territories is dangerous for their people, and they want to get rid of these wastes, without bothering to worry about the inhabitants of the nations where they are trying to store them. That would create an extremely troublesome situation, one that is both unjust and inhumane; it would also place us in a position of inferiority, as a second-rate country where such risks can be transferred so other countries can recover their own tranquility. In any event, an official intention of creating a "nuclear dump" in Argentine territory which could be leased to other nations is definitely unacceptable, for the republic can not become a garbage dump for the nuclear world. While Europe is anguishing over the Chernobyl explosion and its impending image of death, it seems prepared--and this seems to be approved by the government--to accept the sacrifice of multiple generations, doomed to a state of constant fear that would only come to an end, according to reports, in about 20,000 years.

CNEA Statement on Nuclear Storage Site

Buenos Aires LA PRENSA in Spanish 13 Feb 87 p 3

[Text] In response to the editorial published in this paper on 5 February, entitled "A Nuclear Dump" [published as first part of this article], the CNEA's director of radiological protection and safety, engineer Elias Palacios, has issued the following statement: "Studies for the construction of a storage facility in Argentina began in 1973. The purpose of this project will be to eliminate in a safe manner the wastes produced by Argentina's nuclear power plants. The facility should be ready for use by about the year 2010."

"The CNEA did these studies by drawing on all the specialized groups in Argentina which might make significant contributions (universities, institutes, scientists, etc). The objectives of the study and its results were always kept public and were discussed on every level, ranging from elementary schools up to congresses held on this topic, both inside Argentina and abroad. Among those objectives it was stressed that the storage facility in question was intended solely to meet the needs of the Argentine nuclear program."

"Nevertheless, as has happened with a certain amount of regularity in relation to our nuclear activity, we have faced constant pressures from other countries, putting obstacles in our way wherever Argentina was making some definite advances. The stories about this leasing arrangement to third parties or intentions of accepting wastes from abroad is an example of this."

"Production of highly radioactive wastes is a direct consequence of the production of electricity from nuclear energy. The Atucha I plant has been operating, and consequently generating wastes, since 1974; the Embalse plant since 1983; and Atucha II, now under construction, will begin to do so in 1992. These wastes will have to be eliminated in the future. The CNEA has decided to study methods of safe elimination well in advance in order not to transfer the problem to future generations."

"The basic criteria for the elimination of radioactive wastes stipulate that the maximum risk level for persons who are hypothetically most directly exposed must not exceed a small fraction of the risks normally accepted in everyday living. In addition, these risks must be kept as low as reasonably possible. That is why the wastes are stored in deep geological formations, outside of seismic areas, in places of no present or future mining interest, etc. There is international consensus on the technical possibility of attaining these safety objectives, and at the present time, every nation with a nuclear program is engaged in this type of study."

"Obviously, with any doubt about the possibility of safely eliminating the radioactive wastes that nuclear reactors are producing today, it would be a highly irresponsible attitude to allow nuclear plants to continue to operate, thus generating even more wastes."

"The CNEA has a technical and moral obligation to propose a proper solution for eliminating the radioactive wastes the nuclear program generates. This means finding engineering solutions and identifying suitable geological formations. The Sierra del Medio in Gastre, Chubut, would be a technically suitable formation, but any decision to build a storage facility must be made by the national executive, not by the CNEA; this is how a decision about the site of a nuclear power plant is always handled."

7679

CSO: 5100/2071

COUNTRY'S NUCLEAR CAPABILITY ARGUED

CNEN Head Denies Country's Ability To Make Bomb

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 18 Dec 86 p 29

[Article by Jose Roberto Arruda]

[Text] Yesterday, the president of the National Committee on Nuclear Energy, Rex Nazare Alves, in criticizing some sensationalist press notices, said, "Brazil is not capable of building an atomic bomb, and has not yet learned the necessary technology." He explained that Brazil only knows the technology necessary for reprocessing at the laboratory level, as reported by O ESTADO DE SAO Paulo 6 months ago in an article about such laboratory efforts.

Rex Nazare added that, not only has Brazil not yet mastered the industrial technology for reprocessing, it has access to insufficient quantities of plutonium, as well, and could not justify the size of investment required to gear up industrially for production. Up until now, according to him, simulations have been made at the laboratory level, and some relevant equipment has been developed by private industry.

The president of CNEN contradicted the press releases that said that Brazil had produced plutonium in two furnaces 320 meters deep, starting from enriched uranium, in the mountains of Cachimbo, in Southern Para. "I have never seen plutonium produced in furnaces anywhere in the world. Plutonium is obtained through irradiation of the element in power reactors, and all of the fuel burned at Angra I that would make reprocessing possible is under the absolute control of the International Atomic Energy Organization, in Vienna, to which Brazil must present an accounting, gram by gram of its inventory," said Rex Nazare.

He said that what is more important than producing plutonium is assuring Brazilian industry's ability to enter the nuclear age, and to become qualified enough to be ready when it is necessary to reprocess this material industrially for use in rapid regeneration reactors (which re-utilize the fuel that they burn). It is for this reason that Brazil's parallel program is in collaboration with more than 50 private companies, and involves the granting of patents and the development of products; this effort will inevitably lead to Brazil's mastery of the entire fuel cycle, and its qualification as a nuclear power in a few years.

The president of the CNEN confirmed that, in collaboration with private industry, the parallel program is developing the technology of lead containers. These containers are made with lead alloys that impede radiation when radioactive fuel, which is extremely dangerous, is moved from place to place. Brazilian industry has already developed these containers, utilizing techniques and safety precautions that protect the transporter, but have not yet achieved high enough degrees of clarity and transparency.

Another product which is being developed by Brazilian industry, according to Rex Nazare Alves, is the teleprocessor, made by a group of robots directed from an electronic control center. In addition, various chemical products for reprocessing are being gradually developed through this process of interaction with private industry.

In explaining that Brazil is in no way capable of manufacturing an atomic bomb, Rex Nazare said that the press release announcing that the Aeronautical Technology Center has already produced 90 percent enriched uranium is "pure fantasy." The process for enrichment is being developed through armed forces research and within the agencies under the control of the CNEN, all of this at the laboratory level.

According to Rex Nazare Alves, the processes for enrichment that are being developed within the parallel program are: chemical, laser enrichment, ultracentrifuge, and plasma enrichment. All of these processes are still at the experimental stage, and Brazil has not yet mastered the necessary technology, said the CNEN president.

According to him, the key ingredient needed to be able to produce nuclear arms is not what is so important. "The London Club has carried out an extraordinary boycott of Brazil which prevents us from importing a series of products and sub-products of nuclear origin. Hiding behind the invocation of military secrets, the advanced countries say that we are dealing here with sensitive technology; the main object is not to prevent Brazil from building atom bombs, but to prevent Brazilian industry from becoming modern and self-sufficient in advanced technologies such as fine chemicals, data processing, and robotics, all of which were born out of military efforts to construct the bomb," he said.

He added that, for example, we cannot import a super computer for the Aeronautical Technology Center. Other elements such as boron and phosphoric acid must be produced domestically because their sale to Brazil is prohibited. Through our mastery of boron technology, we have already produced teflon and freon domestically. With phosphoric acid technology under our control, we will free ourselves from massive importation, because even Coca-Cola uses this product in its secret formulation.

He pointed out that Brazil imports almost \$300 million in sensitive products which before long will be produced internally as a result of our parallel program. Besides being expensive, these products, according to Alves, carry punishing import duties, and there have already been cases where none have

been available, including medical-hospital products. The London Club simply responded by saying that Brazilian patients should be treated overseas, and refused to release certain radionucleides and the equipment used to control them.

Political Decision Lacking

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 18 Dec 86 p 29

[Article by Roberto Godoy]

[Text] It is now official: at the laboratory level, Brazil has mastered the reprocessing of uranium, and is able therefore to enrich it for fueling the compact reactor of submarines, and for the development of medical and agricultural resources. Or to produce nuclear arms. It all depends on two basic conditions: the ability to demonstrate the efficiency of the technologies involved at the industrial level, and a political decision by the government with regard to where the knowledge should be applied.

The objective is essentially peaceful. Peaceful objectives make the effort worthwhile, and they should be reviewed as a function of strategic issues that are constantly changing. This is the doctrinaire thesis that was defended--and accepted--by two of the individuals responsible for the so-called "parallel program," physicist Sergio Porto and Colonel Albano Amarante of the Air Force. Both died just as their ideas began to produce practical results.

Porto, who directed the research efforts at the Campinas State University, created a method for enriching uranium through excitation of the hexafluor molecule using a laser beam. The results of his research were presented to the scientific community in 1979 at the Brazilian Center for Physical Research in Rio de Janeiro, and immediately thereafter were taken over by the military agency for technological studies.

The work wound up at the Division of Advanced Studies at the Aerospace Technical Center in Sao Jose dos Campos, a unit directed by Colonel Amarante. The meeting of the two scientists, civilian and military, led to the beginning of the project on the fast breeder, which uses plutonium as fuel and generates more plutonium--the material used in military atomic devices. In addition, Amarante directed the transformation of the Division into the Institute for Advanced Studies, today the most active and modern laboratory in the country, where, underground, is located the largest computer on the continent, to which physical access can be gained only by means of a variable electronic code. (Curiously, both scientists died under intriguing circumstances, to say the least. Sergio Porto, an athlete who was in good physical shape, suffered a heart attack while he was playing soccer with others who had attended a closed symposium in the Soviet Union. Colonel Amarante was afflicted with a rare form of cancer brought on by a virus, diagnosed after his return from a trip to Europe).

The entire project is divided among the scientific centers of the Air Force, the Navy, and the Army, probably coordinated by the National Commission on Nuclear Energy. It is a project for peace, but, in any case, all of the military knows what it could be turned into if mobilization of this technology became necessary for national security purposes.

The Air Force is studying medium-range missiles of the MRBM class (with a range of 1500 to 3500 km); the Navy is exploring nuclear-powered attack submarines, capable in the long term of being equipped with missile launchers similar to those used today by France, for example; and the Army is considering a "family" of tactical weapons in the 400 km range, but usable in the range of 150 km. All of this, though, is theoretical. "One concern over the next 20 to 30 years," according to an official involved in the effort.

At this point in time, the only project already under execution is the nuclear-powered submarine, equipped with non-nuclear armament. The Navy has its own means for enriching uranium using ultracentrifuge imported from Germany almost 40 years ago, and situated at the Institute for Technological Studies in Sao Paulo. They had been abandoned, but are now operative. The Germans doubted that the centrifuges could be utilized in this fashion.

At the laboratory level, the enriched material, in quantities that have not been made public, is already sufficient to meet the requirements of small nuclear devices, such as are used for producing sound waves, and later for long-life satellites and highly specialized medical instruments. The program continues. And the readiness data, mentioned for the first time by the government in December 1983 as the time at which experimental studies would be completed and industrialization of the know-how launched, continues the same: 1990.

12857/12851
CSO: 5100/2058

BRAZIL

SARNEY ON NUCLEAR-FREE ZONE PROPOSAL, ARMS RACE

PM201425 Moscow ZA RUBEZHOM in Russian No 11, 13-19 Mar 87 (Signed to Press 12 Mar 87) pp 12-14

[Vadim Polyakovskiy reportage: "Brazil: Two Countries in One"]

[Excerpts] Rio de Janeiro-Brasilia-Moscow--[Passage omitted] President Jose Sarney kindly received ZA RUBEZHOM's special correspondent in the Planalto Palace. [passage omitted]

"What aim was Brazil pursuing by submitting to the United Nations the proposal to proclaim the South Atlantic a nuclear-free zone?"

"Lasting peace and world security are the great desire of all mankind. We in Brazil want our continent to be a zone of peace. Our signature is on the Tlatelolco Treaty, which proclaims Latin America a nuclear-free continent. Developing that initiative, we submitted at the last UN General Assembly session a proposal -- incidentally, it met with almost universal approval, and only the United States and a few other countries voted against it -- to create in the South Atlantic a zone of peace and cooperation, a nuclear-free zone free of tension. We have every reason and the authority to make this proposal -- for more than 100 years now Brazil has not held a single armed conflict with its neighbors. We resolve all problems by means of dialogue."

"Could you express your attitude to the USSR's initiatives aimed at creating a nuclear-free world?"

"Brazil invariably advocates ending the arms race and creating a climate of trust and mutual understanding. The path leading to this is not easy, and we consider it our duty to support any initiative that moves in that direction. The day when mankind is rid of the nuclear threat will be a great day."

/9738

CSO: 5100/2073

REPORT ON PAKISTANI NUCLEAR BOMB CAUSES CONCERN

Calcutta THE STATESMAN in English 2 Mar 87 p 1

[Text] NEW DELHI, March 1.—Official sources here today expressed serious concern over Press reports quoting a Pakistani nuclear scientist that his country had developed an atomic weapon, report PTI and UNI.

The reports only confirmed India's charge that Pakistan's nuclear programme was "weapon-oriented" the sources said. "This is a matter of serious concern", they added.

Pakistan has manufactured an atom bomb but has no immediate plans to test it, Dr Abdel Qader Khan, Pakistan's top nuclear scientist, has said.

In an interview published today by the London-based daily, The Observer, Dr Khan said the Central Intelligence Agency of the USA knew that Pakistan had produced the bomb, thus entering the exclusive world nuclear club.

He said weapons-grade uranium was being produced at the Kahuta laboratories and Pakistan would not need to test the bomb. The 51-year-old nuclear scientist, who heads the top-secret uranium laboratories at Kahuta, said Pakistan had also mastered plutonium reprocessing and was now way ahead of India in this field.

On reports that the Kahuta plant could be attacked, Dr Khan said India knew the price it would have to pay in such an event. But he hoped at the same time that India and Pakistan would agree not to use nuclear weapons against each other.

The Soviet Union has denied it planned to bomb Pakistan's nuclear facility at Kahuta. The U.S. Carnegie Foundation's report in this connexion "is a gross invention which has nothing to do with reality", authoritative sources said.

The sources said the report was aimed at poisoning Soviet-Pakistani relations and disrupting the current Geneva talks between Afghanistan and Pakistan. The sources, however, reiterated the Soviet stand that the Pakistani nuclear programme had military overtones.

However, according to a late night PTI report Dr Abdel Qader Khan today disowned a newspaper report that quoted him as saying that his country possessed a nuclear bomb and had uranium that was 90 per cent enriched. In a statement issued in Islamabad he said that some of his remarks had been taken out of context to make the world believe that Pakistan had a nuclear bomb.

/13104

CSO: 5150/0101

PAPER COMMENTS ON PAKISTAN'S NUCLEAR AMBITIONS

BK111509 Calcutta THE STATESMAN in English 4 Mar 87 p 8

[Editorial: "Make Bombs, Not War"]

[Text] To observers beyond the subcontinent, the ups and downs of the India-Pakistan relations must often seem like a delightful yo yo, but now the nuclear threat takes the fun out of the game. On the face of it though, play goes on, both at the foreign secretaries' level and on the cricket field. Even after Dr Abdul Qadir Khan's sensational disclosures, Mr Abdus Sattar and Mr Alfred Gonsalves signed an agreement on defusing tension along the border. This virtually completes the de-escalation process begun in New Delhi last month, while allaying Islamabad's fears about operation Brass Tack — which is to continue as scheduled — and with regard to the sealing of the Punjab border by Indian troops. And, while New Delhi ensured that President Zia did not extract the kind of political mileage he might have expected from his Jaipur trip, the visit undoubtedly helped to reduce war psychosis at the popular level. To that extent Dr Qadir Khan's disclosures about Pakistan's nuclear prowess could not have been worse timed. From his highly convoluted semi-denials it would seem that Dr Khan did indeed make most of the remarks attributed to him. In fact, by complaining of unethical practice, and of a "private" conversation being reproduced, Dr Khan in effect admits that the report is accurate in substance.

However, it has to be admitted that the Pakistani scientist's claims are no revelation, although they confirm many earlier suspicions. Reports in American Press suggested last November that Islamabad was only "two screw driver turns" away from possessing a full-fledged nuclear bomb, and had detonated a

triggering device some time between September 18 and September 21. Dr Khan has now confirmed the story, adding that Pakistan is capable of enriching Uranium to 93.5 percent which makes it weapons grade. He has even gone on to boast that Pakistani scientists have achieved in 7 years what their Indian counterparts took 12 to do, and that his country's plutonium reprocessing capabilities are way ahead of India's. By describing American media account of Pakistan's nuclear accomplishments as "correct", Dr Khan has thus only reaffirmed what was already widely suspected.

The astonishing aspect of the disclosure, however, is Dr Khan's assertion that the CIA knows about all this. President Reagan's decision to seek a further 6-year waiver on the Symington Agreement (as published) assumes a sinister dimension in this context. In other words, the Reagan administration, which ritually denounces nuclear proliferation in passionate language, is apparently prepared to ignore the information gathered by its own espionage agencies in order to assist the conventional militarization of a nuclear Pakistan. With President Reagan bending over backwards to please General Zia, the much-maligned Nixon-Kissinger "tilt" of the early seventies now seems an almost innocent gesture. That India-U.S. relations will suffer a sharp setback in light of the latest evidence of Washington's hypocrisy hardly bears emphasizing. At home more and more people are bound to ask what further proof the government requires before reviewing its nuclear policy. If Pakistan can make a bomb and claims it is for peaceful purposes only, India too may be under pressure to manufacture a bomb, even only for display.

/9274

CSO: 5100/4724

AEC APPOINTMENT MAY MEAN CHANGE IN NUCLEAR POLICY

Calcutta THE TELEGRAPH in English 11 Feb 87 p 8

[Text]

The controversy over the appointment of a new chairman of the Atomic Energy Commission should never have taken place. There are some jobs—for instance, the chiefs of staff of the armed forces, or ambassadorships to key nations—which need the direct attention of a prime minister. They must, because in these responsibilities lies the key to the safety of a nation; these posts are too important to be the concern of anyone but the Prime Minister. That is all the more reason why there should never be any bungling in either the choice or the process of such appointments. And in the matter of transition at the Atomic Energy Commission, the confusion was particularly inexcusable.

Why? First, because there was enough time to find a successor. There was no secret about when Dr Raja Ramanna was going to retire, and he himself had reminded the political authorities that they should ensure a smooth transition. Instead, a successor was named only at the very last minute, when the cabinet secretary Mr C.D. Deshmukh passed on the news to Dr Ramanna on the telephone near midnight—just hours, in other words, before Dr Ramanna was to relinquish charge to his successor. There was absolutely no need for such a delay; a successor could have been named comfortably in advance.

Second: it is not as if the options are extensive. Essentially such a job can only go to one of a very small handful of people, so if a prime minister knows what he wants of his nuclear policy it should not be difficult for him to choose the man he thinks can deliver. Those who are arguing that similar confusion arose when Dr Ramanna got the job, are using a very poor argument: a bad precedent certainly does not justify repetition. However, one wonders if the announcement of Dr M.R. Srinivasan's appointment any earlier would have prevented the early retirement of Dr P.K. Iyengar, who expected to get the job, particularly since he had Dr Ramanna's backing. Dr Iyengar's disappointment at having lost a lifetime's dream is understandable. But there is more to it than simply the destruction of a single dream. The question is whether Dr Srinivasan's appointment also represents an unsaid shift in the country's nuclear policy. This, after all, is the question that must be getting asked in foreign offices around the world. Everyone recognises what India is capable of in the nuclear field, and would like to know if Mr Rajiv Gandhi is signalling a change from past policy.

The answer to that will emerge gradually, because such questions never elicit direct replies. The fact that Mr Rajiv Gandhi has not changed his mind despite the pressure of Dr Iyengar's resignation, and then retirement, means that Dr Srinivasan's appointment is a result of prime ministerial policy rather than just the Prime Minister's personal preference. A prime minister of course has the right to choose his team but, as in the case of the departure of Mr A.P. Venkateswaran, it was the method rather than the decision which created unease. The Srinivasan era begins with unusually severe labour pains, but we hope that at least the child will be healthy. Dr Srinivasan's first task is cut out for him—to restore the amity, and end the infighting that has inevitably accompanied this change of guard. We hope he can achieve that soon, and carry with him not only those scientists who are happy with his elevation, but also those who are sceptical about it. The nation after all needs both kinds of intellects.

/13104

CSO: 5150/0095

AEC CHAIRMAN-DESIGNATE TELLS NUCLEAR POWER PLANS

Madras THE HINDU in English 26 Feb 87 p 3

[Text]

The proposal to create a Nuclear Power Corporation is at an "advanced stage of consideration", Dr. M. R. Srinivasan, Chairman, Nuclear Power Board, and Chairman-designate, Atomic Energy Commission told reporters today.

According to him, the corporation is likely to come into being within three to six months. It is intended to help the Department of Atomic Energy tap funds from the capital market through the issue of bonds similar to the ones floated by public sector agencies such as the Neyveli Lignite Corporation and the Railways.

Dr. Srinivasan said that the target of setting up 10,000 MW of nuclear power capacity by the turn of the century could still be accomplished.

He conceded that the commissioning of the first unit of the Narora atomic power plant in Uttar Pradesh would be delayed by three to four more months because the delivery of the steam generator made by BHEL was going to take more time. The unit may now be ready only by the middle of 1988 instead of March, 1988.

Varsity-industry partnership urged: Earlier, delivering the inaugural address at a workshop on structures for nuclear power reactor

technology organised by the Department of Civil Engineering, Indian Institute of Technology, Madras, Dr. Srinivasan called for stronger cooperation between experts in universities and industry. He said he would examine whether it would be possible for the Department of Atomic Energy to take on the IIT as a partner in the development of the 500 MW prototype fast breeder reactor which was in progress at Kalpakkam.

It was Prof. L. S. Srinath, Director, IIT, who posed this idea of cooperation, while delivering his presidential address at the function. Pointing out that the IIT and the Indian Space Research Organisation (ISRO) had set up a cell on campus, he suggested that a similar cell be created with the help of the Department of Atomic Energy.

Mr. C. V. Sundaram, Director, Indira Gandhi Centre for Atomic Research, Kalpakkam, said the design of the containment building for nuclear reactors had assumed greater importance because of safety considerations. The workshop should address itself to this aspect and evolve guidelines to improve reactor safety.

Prof. Harihar Ramani, Head of the Department of Civil Engineering, IIT, welcomed the participants.

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CSO: 5150/0099

DELHI APPOINTS NEW HEAD OF ATOMIC ENERGY COMMISSION

Background on Srinivasan

Bombay THE TIMES OF INDIA in English 10 Feb 87 pp 1, 3

[Text]

The Times of India News Service
NEW DELHI, February 9.

THE government today decided to appoint Dr. M. R. Srinivasan as chairman of the Atomic Energy Commission and secretary, department of atomic energy, with effect from March 1.

Dr. Srinivasan will take over from Dr. Raja Ramanna, whose extended term as chairman of the commission ends on February 28.

The government's decision was this time formally announced during the day and released to the press even before many people in the department of atomic energy had known about it.

Dr. Ramanna was to have retired from service at the end of last month, but had been asked to stay on for another month in very controversial circumstances. In fact, he was first advised to hand over charge to Dr. Srinivasan, but before he could do that he received revised instructions from New Delhi.

The revised instructions were sent after another contender to the post of chairman of the Atomic Energy Commission, Dr. P. K. Iyengar, made it known that he would resign as director

of the Bhabha Atomic Research Centre in the event of Dr. Srinivasan succeeding Dr. Ramanna.

Following this controversy and a polarisation between scientists and engineers in the atomic energy establishment, the Prime Minister, Mr. Rajiv Gandhi, initiated a consultative process for the appointment of Dr. Ramanna's successor.

He had separate meetings with both Dr. Srinivasan and Dr. Iyengar and also discussed the issue with Dr. Ramanna and Prof. M. G. K. Menon, member, planning commission and science adviser to the Prime Minister.

The Prime Minister perhaps saw no reason to change the earlier decision to let Dr. Srinivasan take charge from Dr. Ramanna.

Dr. Srinivasan, unlike Dr. Iyengar who is an experimental physicist, is an engineer with doctoral work on combustion problems in gas turbines. After working for one year in the U.K. as design engineer in Ruston and Hornsby Ltd., Dr. Srinivasan joined the department of atomic energy in 1955 and participated in the construction of India's first research reactor, Apsara. He was responsible for the execution of the first atomic power station at Tarapur which was commissioned in 1969.

Dr. Srinivasan then shifted to Madras as the chief construction engineer for the Kalpakkam nuclear power plant. He later became director of the power projects engineering division which was later reconstituted as nuclear power board. He took over as its chairman in 1984.

The nuclear power board, along with its operating and construction units, has a combined work force of about 7,000 of whom professional engineers and scientists are about 1,400. Dr. Srinivasan was awarded the Sanjay Gandhi award for science and technology for 1983 and the Padma Shri in 1984.

Our Staff Reporter adds from Bombay: The immediate emphasis in India's nuclear programme will be in enhancing the power output from nuclear reactors, Dr. Srinivasan said tonight.

He said nuclear research work for peaceful purposes would continue, especially in its applications to medicine, agriculture and industry.

Expressing his happiness at his appointment, Dr. Srinivasan sought the co-operation of all scientists and engineers in the atomic energy establishment for the "big task" that lay ahead of him.

Meeting With Newsmen

Bombay THE TIMES OF INDIA in English 2 Mar 87 p 3

[Text]

BOMBAY, March 1 (PTI): The newly-appointed chairman of the Atomic Energy Commission (AEC), Dr. M. R. Srinivasan, has stressed the need for ensuring the safety of persons

working with nuclear reactors and those around them.

In an informal chat with newsmen soon after taking over charge yesterday, he said definite steps would be taken to achieve the target of 10,000 MW of electricity by 2000 A.D.

Dr Srinivasan said nuclear energy has to supplement the coal and hydro sources in a big way.

He said since the country's nuclear programme was essentially "home grown", the importance of research and development would be greater in future.

Reactors have to be built in shorter duration to make them more

economical or we will have to hasten up the entire planning process, he said.

Pointing out that the workforce in the development of atomic energy establishment is now an amazing 30,000, he said, "institutionalising their welfare activities would be major concern for me".

The morale and creativity of people in the establishment were two important aspects of making the nuclear programme a success, he said.

Application of radio isotopes in medical and agricultural purposes and radiation for industrial purposes would be two important areas of research in the near future, he said.

Interview With TELEGRAPH

Calcutta THE TELEGRAPH in English 14 Feb 87 p 11

[Interview with Dr M. R. Srinivasan, chairman of the Atomic Energy Commission, by Lekha Dhar]

[Text]

Dr Maiur Ramaswamy Srinivasan may be a name to reckon with in India's nuclear power programme, but even as he steps into the shoes of the high profile Dr Raja Ramanna, he is relatively unknown to the public.

The cloud of controversy that preceded Dr M.R. Srinivasan's appointment as chairman of the Atomic Energy Commission (AEC) has finally cleared and he is getting set to play his new role at the helm of India's nuclear programme from March 1. "The most important task ahead will be the implementation of the department of atomic energy's (DAE) programme. The use of nuclear technology for industry and agriculture, research and development inputs into the nuclear programme are all going to be stressed. The construction of projects will be pushed forward and plants will be built in less time. The optimum management of the entire programme and R&D inputs, especially as our technology is home drawn, is very important," the unassuming new chairman of the AEC, told The Telegraph.

A brilliant student, Dr M.R. Srinivasan topped the College of Engineering, Bangalore, and

went on to McGill University in Montreal on a scholarship from the Canadian government. On completing his post graduation in 1952, he went ahead with his doctorate at McGill on the combustion problems in gas turbines. After working for a year with Ruston and Hornsby Ltd, England, Dr Srinivasan joined the DAE in September 1955 and began with great promise, participating in the construction of Apsara, India's first research reactor.

Responsible for setting up an engineering laboratory for R&D in the field of reactor engineering in 1959, Dr Srinivasan was the principal project engineer of the group which executed the first atomic power station at Tarapur. TAPS, as its acronym reads, was also the first atomic power station in Asia, outside of the Soviet Union, when commissioned in 1969. The Madras Atomic Power Station (MAPS) was completed under Dr Srinivasan's guidance. MAPS is India's first indigenous atomic power station.

Acclaimed as a master in design, project planning and execution and the creation of

indigenous capability for manufacture of nuclear and conversional equipment and components Dr Srinivasan proved the claim by directing the power projects engineering division of the DAE from 1974 and the commissioning and the operating of all the atomic power stations in the country.

The power projects engineering division was later reconstituted as the NPB and Dr Srinivasan was appointed as its first chairman from May 29, 1984. He has led and guided NPB's workforce of 7,000 engineers and 1,400 scientists, which is currently executing work of Narora, Kakrapar and has initiated work at Kaiga, Rajasthan in setting up 500 MW nuclear unit.

Commenting on the 500 MW reactors, and any likely problems connected with them, Dr Srinivasan said they were "proceeding quite well" and that they had begun to place orders for the components.

The ambitious 10,000 MW plan will be high on his agenda when he takes over as chairman, AEC. The present installed capacity of electric power generation for India is

42,000 MW, but it is expected to touch about 120,000 MW by AD 2000 and 160,000 by AD 2005. Sixty four per cent of this is thermal, 33 per cent hydel power and three per cent nuclear—the ambitious hope is to step up the nuclear contribution to this almost five times. "Our target is still 10,000 KW," says Dr Srinivasan. "We hope we will be able to achieve it. We have 13 years left and we should make it by then."

Dr Srinivasan refuses to comment on the controversy that preceded his final appointment, throwing a negative light on the politics in India's premier scientific community. "I do not wish to comment on controversies," he says, indirectly discounting what is seen as the great divide between scientists and en-

gineers in the nuclear community. "Our greatest strength has been the teamwork between the scientists and engineers and the different departments which make up the scientific unit. This work must be sustained." He emphasises that this will be one of the major tasks ahead of him as chairman, AEC.

Discounting views that too much money is spent on the country's nuclear programme, at the cost of the basic needs of the people which are neglected, Dr Srinivasan feels that nuclear power diverted to industry and agriculture will be able to meet the needs of the people.

Talking of reactors and the reports saying that he has an open mind to the Soviet offer, as opposed to the French one, Dr Srinivasan merely

says, "There are various discussions in progress. We will have to weigh the pros and cons and see which reactors are more useful to us. I have not finalised my views on the subject."

A Padma Shri (1984) and one of the foremost experts in the field of nuclear power in India, Dr Srinivasan, emphasises "safety" in the nuclear programme. After a number of disasters that the world has seen and the dangers of a nuclear threat which have inspired a number of campaigns against nuclear technology Dr Srinivasan emphasises that the primary lookout will be to "ensure that our plants are operationally safe and do not pose a danger to people in general. This is essential, and what we will strive for."

Search To Fill Other Posts

Madras THE HINDU in English 11 Feb 87 p 9

[Article by G. K. Reddy]

[Text]

NEW DELHI, Feb. 10

After announcing the appointment of Dr. M. R. Srinivasan as the next Chairman of the Atomic Energy Commission (AEC), the Government is now looking for a suitable successor to him as head of the Nuclear Power Board who will also be an ex-officio member of the Commission.

Apart from selecting a new Chairman for the Nuclear Power Board (NPB), the Government has to find a new Director for the Bhabha Atomic Research Centre (BARC) in the place of Dr. P. K. Iyengar who is proceeding on voluntary retirement.

The Director of BARC, who has the same status as the Chairman of NPB, is also an ex-officio member of the Atomic Energy Commission. The two have the rank of Secretaries to the Government in their respective spheres, while the Chairman of AEC who is also Secretary to the Department of Atomic Energy (DAE) and is head of the entire atomic energy establishment is rated as a Principal Secretary.

Another seeks retirement? There are reports that Dr. N. Sreenivasan, head of the heavy water programme, who is also an ex-officio member of AEC, might seek voluntary retirement.

The Government is thinking of restructuring the entire nuclear establishment to provide for a hierarchical system, even while ensuring a better functional division of responsibilities between the heads of various divisions.

One of the first things the Government has to do before embarking on this exercise, is to decide whether the Atomic Energy Commission in its present form has outlived its utility or has a relevant role to play still in providing the higher direction to the country's nuclear programme. A decision on this key issue will be taken after studying the powers and responsibilities of similar commissions or bodies in the United States, Canada, Britain and France to see whether any changes are needed in the Indian establishment.

The AEC was created in Nehru's time to enable it to function as a non-bureaucratic structure, free from rigid governmental rules and regulations, and to serve as an ideal institution for the management of the country's atomic energy programme.

It functioned quite efficiently during the stewardship of Homi Bhabha who was widely accepted as a father figure of India's nuclear programme because he had leadership qualities that enabled him to pool the available talent and make the nuclear scientists work together as a team. But after his death it became apparent that an administrative structure, however good in its concept, could not by itself produce or bring together the right type of men to run it as an effective institution.

Two posts: At the same time the personal rivalries and group politics that developed over the years in the atomic establishment could not be blamed on the structural deficiencies of AEC or the incongruity of having the same person serve simultaneously as chairman of the commission which is a privileged institution and Secretary of the Department of Atomic Energy that was subject to normal governmental procedures. All these aspects will no doubt be looked into before a decision is taken on how to restructure AEC and make it serve as a more effective instrument of higher policy and direction.

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OUTGOING AEC CHAIRMAN DISCUSSES NUCLEAR POLICY

BK260134 Delhi Doordarshan Television Network in English 0215 GMT 26 Feb 87

[Interview with outgoing Atomic Energy Commission chief Dr Raja Ramanna by Mukul Sharma; date not given — recorded]

[Excerpt] [Sharma] Dr Ramanna, how much has India compromised on its nuclear policy by submitting to these international discriminating safeguards?

[Ramanna] If we believe that atomic energy should be used only for peaceful purposes, and if one country gives assistance to another country in the form of a reactor, in the form of fuel, then there should be some international regime which will see that the fuel that is being given is not diverted. Many years ago we accepted safeguards on any fuel that we may buy from outside, in the hope that eventually all countries — I underline all — should also sign the safeguard agreements. But as it happened, now we have agreed to safeguards on any fuel that we are supposed to buy from outside, but there are group of countries which call themselves weapon countries and do what they wish. While we have not really compromised on any principles because we believe in safeguards, the countries who call themselves weapon countries have done nothing to come down to the international regime that we can finally outlaw weapons, nuclear weapons. And, therefore, while we have not compromised, the others have become more rigid in their attitude toward the application of safeguards for themselves. They have made some attempts to put one or two reactors under safeguards, and, well, the conditions they have applied to themselves are so free and lax that it does not mean anything. But the answer to your question, we have not compromised on safeguards in any way; but we feel sorry that five countries have decided to be the lawmakers and say that we are free from the law but all the others should follow the law.

[Sharma] Why is there a renewed talk again on both sides of the India-Pakistan border these days on the bomb?

[Ramanna] Well, I think the whole question of the bomb in the subcontinent has come about because Pakistan has claimed that they have built an enrichment plant. Now, an enrichment plant is one in which the uranium-235 content — you know that uranium consists of 235 and 238 — and it is the 235 content which easily fissions. Now an enrichment plant is one in which the 235 content is increased by some various physical processes, and this enrichment plant, in principle, can enrich the uranium to 90 percent of uranium-235. And if uranium-235 is increased to that level, it can be used for bombs. So, in principle, if you have a large number of enrichment units, the uranium can be made

into weapon-grade quality, which can eventually be used for a bomb. Naturally, a neighboring country having nuclear weapons is bound to cause suspicion in the eyes of the people in the neighboring country, and hence a public debate is on as to whether we just watch one country developing weapons and the other is doing nothing about it.

[Sharma] Will this lead to a stage like in the U.S.-USSR relationship, you know why, because one side has the bomb, the other side has another bomb?

[Ramanna] We are poor countries, and we should not get into this kind of escalation, and the prime minister has certainly made one statement in parliament that if Pakistan ever explodes a weapon or a test weapon, India just cannot watch. It will have to reconsider its policy. But what that reconsideration means depends on how the two countries get together. But it is good that we have organizations like SAARC [South Asian Association for Regional Cooperation] where all this can be discussed between the countries concerned.

[Sharma] This is a silly question, but because of repeated denials, is it true that India will never make the bomb?

[Ramanna] I would certainly prefer an India which does not explode weapons and that we have to depend on nuclear weapons for our defense. [sentence as heard]

[Sharma] So would I, but it only depends on whether our neighboring countries develop a bomb or not.

[Ramanna] Well, I think I would like a universal regime that all countries give up nuclear weapons, because it will be a destruction of the whole world. It is not realistic, there is no victory in using nuclear weapons.

[Sharma] Yes, but what are these peaceful purposes that atomic energy is being put to?

[Ramanna] Electric power is one of the important contributions, and our program has become one in which we are 90-percent self-sufficient in all the components required for building a nuclear power station. Now, that is a fantastic achievement, which has not been achieved by many countries of the world except the superpowers and some of the advanced countries.

And testing leakages, seepings in dams — you know, water seeps in a dam — and you want to find out which part is seeping, isotopes can be used for this purpose. And to answer you, the amount of money has been made, for instance, in desilting harbors — you know, harbors that clog with silt — and in the old days we used to take the silt and dump it in a place by these dredging operations, and the next monsoon this used to come back (Ias heavily) to the same place. Now by use of isotopes we know where to dump it so that it will not come back. And you can not imagine the crores worth of rupees that is saved in these dredging operations as a result of the use of radio isotopes.

In the old days everybody used to dump a lot of chemicals and nobody know what happened to the human beings. But after Bhopal and all those incidents, we know that chemical treatments are even more dangerous because it stays there in residual system where the radiation just passes and does not live a trace.

[Sharma] But why wasn't this radiation for food thing ever implemented?

[Ramanna] It is used practically in all the countries of the world except India, because somebody long ago said all these people suffering from malnutrition, this may cause more problems and never prove anything.

[Sharma] Obviously, the person who said that must have carried a lot of clout.

[Ramanna] Well, we leave it at that.

INDIA SOON TO LAUNCH THERMONUCLEAR RESEARCH

New Delhi PATRIOT in English 12 Feb 87 p 5

[Text]

In a quest to tap an unlimited and economical energy-fusion power source, India will soon launch thermonuclear research, reports PTI.

The Centre for Advanced Technology (CAT), being set up by the Bhabha Atomic Research Centre (BARC) at Indore in Madhya Pradesh, will carry out basic as well as applied research in thermonuclear reaction and to develop technologies for applied areas, reports the journal "nuclear India".

The hi-tech R and D at CAT will concentrate on application of lasers and accelerators in thermonuclear reactions.

In thermonuclear reaction, high-powered laser guns are bombarded over droplets of deuterium-tritium ice resulting in the release of tens of millions of degrees of temperature which can be tapped for producing electricity.

One gram of deuterium (heavy hydrogen) and tritium (super heavy hydrogen) participating in a thermonuclear fusion release as much energy as 10 tonnes of coal.

Deuterium can be obtained from ordinary water with the present level of technology in the world. Tritium is obtained from lithium (by irradiating it with neutrons), reserves of which are in plenty on the earth.

Work in the area of laser technology will involve the development of both high power pulsed lasers and continuous lasers. Apart from developing carbon dioxide axial as well as transverse flow lasers, other lasers like copper vapour lasers, dye lasers, excimer lasers and Nd: yag lasers will be developed for use in medicine, spectroscopy and semiconductor industry.

Within the next 20-25 years the CAT would project technologies to exploit thermonuclear fusion of deuterium and tritium in economical and viable reactors.

TIWARI: NO INTENTION TO BUILD NUCLEAR BOMB

New Delhi PATRIOT in English 28 Feb 87 p 1

[Text]

External Affairs Minister N D Tiwari asserted in the Lok Sabha on Friday that India would take appropriate step to meet any eventuality in case Pakistan manufactures a nuclear bomb.

However, the Indian Government has no intention to make atomic bomb at the present, and its nuclear programme was solely a peaceful exercise.

Mr Tiwari was replying to a spate of supplementaries raised by members, both from the ruling party and the Opposition, who expressed concern over the Pakistan's nuclear programme and the US military aid being given to it.

Mr Tiwari expressed hope that US Congress would reject the request by the Reagan administration seeking extension of Symington Law which forbids military aid to a country intending to acquire nuclear weapon capability. The Minister shared the hope with the members who, quoting a number of press reports and pro-Indian Senators, said that the public opinion in the US would work to thwart Pakistan going nuclear.

Replying to questions by Mrs Jayanti Patnaik and Mr Murlu Deora, Minister of State for External Affairs Eduardo Faleiro said there was credible information that Pakistan was in the process of developing nuclear expertise, which was not entirely for peaceful purpose.

Mr Faleiro told Mr G G Swell that at no point of time did India intend to make the bomb. "We are for nuclear disarmament".

Mr Faleiro told Mr Madhav Reddy that Pakistan was having a project for uranium enrichment.

NUCLEAR POWER DIRECTOR: INDIA CAN MAKE REACTOR PARTS

Bombay THE TIMES OF INDIA in English 21 Feb 87 p 23

[Text]

THE Indian industry has now reached a stage where it can take up the manufacture of critical components for nuclear reactors without affecting cost and time schedules, according to Mr. S. L. Kati, executive director of the Nuclear Power Board (NPB).

He was delivering the key-note address at a three-day symposium on "Indigenous nuclear equipment", held at the Bhabha Atomic Research Centre (BARC) here recently.

Mr. Kati said the problems associated with the earlier phases of indigenisation, which had led to considerable slippages in schedules and cost increases, had now been overcome, and the private industry could assume a bigger responsibility in India's nuclear programme.

The public and private sectors, which now supply main reactor vessels, steam generators, reactivity mechanisms and primary coolant pumps to the department of atomic energy, will be relied upon more for manufacturing quality equipment for the proposed 500 MW power reactors, he said.

Mr. Kati said the total financial outlay for the programme of 10,000 MW of power by 2000 A.D. was about Rs. 14,000 crores, with construction and running of reactors alone accounting for nearly 63 per cent of the cost. With the proper component now reduced to about ten per cent, bulk of the reactor materials will have to be manufactured locally, he said.

N-POWER CHEAPER

The NPB was considering a proposal to award full-fledged supply-cum-erection contracts to the private industry

for many of the conventional systems to speed up construction schedules through increased mechanisation, Mr. Kati said.

Quoting a committee report on the comparison of cost of power from pressurised heavy water reactors and coal-fired thermal power stations, Mr. Kati said the overall investments for the nuclear power option would be lower than that for thermal power involving coal transportation.

He said with the completion of the Fast breeder test reactor (FBTR) at Kalpakkam, design activities were now oriented towards a 500 MW prototype fast breeder reactor, and a feasibility report for the project had been prepared.

The workshop, which was inaugurated by Dr. V. S. Arunachalam, scientific adviser to the defence minister, was also attended by representatives of the private industry.

Mr. T. S. Champaknath of the confederation of engineering industry, lamented the Centre's failure in providing adequate reliefs to them. He said while the public sector was receiving preferential treatment through various schemes, it was the private industry which had shown its capabilities in nuclear equipment design and manufacture.

The workshop, organised by the Central Workshop in BARC, was attended by over 200 delegates from various departments of the atomic energy establishment. Among those present were Dr. N. Srinivasan, chief executive of the heavy waters project and Mr. S. Challaappa, associate director, engineering services group, BARC.

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CSO: 5150/0098

AEC OFFICIAL WRITES ON HEAVY WATER PRODUCTION

Madras THE HINDU (Survey of Indian Industry) in English 1986 pp 91, 93

[Article by N. Srinivasan]

[Text] **T**HILL recently the heavy water programme was considered the Achilles heel of the Indian nuclear power effort. Denigrators of the nuclear programme argued that even if power from this source was necessary, the availability of heavy water was uncertain and hence the programme was not feasible.

Many statements have appeared in the press and in public on the "failure" of the heavy water plants. Conjectures have been aired in many "studies" that the heavy water used in the non-safeguarded nuclear power stations is not of indigenous origin! But the situation today is that not only are the current requirements being met from indigenous production but its availability is also ensured for the nuclear power projects under construction.

At the same time, production capacities have to be tuned to the nuclear power programme's requirement, as the demand for heavy water, in bulk, arises at one time, whereas its production is spread over a period to make it cost effective.

When India opted for the pressurised heavy water reactor for its nuclear power programme, heavy water was expected to be available in large enough quantities from friendly countries. But the founding fathers of the programme also visualised a day when such availability would be in question and India would need to have its own sources. This has proved prophetic. The most common process before the Sixties was the dual temperature isotopic exchange of deuterium between water and hydrogen sulphide gas. This process was adopted for large-scale production of heavy water in the U.S. and later in Canada.

Given the toxicity of hydrogen sulphide and the concern for prevention of environmental pollution, it is doubtful that if this process, had it been developed in the Eighties, would ever have been found acceptable. However, this process has had a good record in Canada from the view point of safety; large capacities, based on this process, were established in Canada and large quantities produced. In fact, the production has been so much that some capacities had to be shut down.

India's Atomic Energy Commission (AEC) also started work on this process in the early Sixties so as to be prepared for production of heavy water at the appropriate time. The Bhabha Atomic Research Centre established detailed flow sheets and engineering design for a plant. Laboratory and pilot plant experiments were carried out on process and corrosion aspects. Based on the availability of surplus steam from the nuclear power reactors at the Rajasthan Atomic Power Station, the Kota heavy water plant was decided upon.

Alternative technology

The AEC was, however, fully aware of the need for an alternative technology as well. When pilot plants in France and Germany showed encouraging prospects for the ammonia-hydrogen exchange for enrichment of deuterium and when this know-how was available without any strings, the AEC correctly opted for setting up capacities based on these technologies. A purely commercial approach would have been against accepting these new technologies as they had been demonstrated only on pilot plant and laboratory scale.

Fortunately this did not deter the AEC though the Indian plants would be the first ones of their sizes and capacities. The induction of these technologies was particularly attractive on account of the number of fertilizer plants of significant capacity coming up in the country and the consequent availability of synthesis gas at practically no cost for extraction of deuterium.

This far-sighted approach in the Seventies and the Eighties came in for severe criticism due to the apparent lack of success of the plants. It was unfortunate that the success or otherwise of these technologies was sought to be compared with the few success stories in other chemical plants. Most chemical plants, as for instance in the fertilizer industry, have come into India after extensive development and production experience elsewhere. Also most equipment were of established design and manufacture and for quite some time were imported. On the other hand, the technologies for heavy water production were totally new and untried elsewhere.

It was perhaps good that the plants encountered many problems because their solutions enabled not only the absorption of the technology, but also improvements, not visualised by the designers. A simple instance of a basic improvement was the catalyst potassium amide concentration to be used in the Baroda and Tuticorin plants. It had to be modified substantially, from what was prescribed by the French suppliers. This concentration depended not only on its efficiency but also on problems encountered in other parts of the plant on account of the high concentrations prescribed by the designers. Several equipment had to be modified, based on process experience and difficulties encountered.

Today both the Baroda and Tuticorin heavy water plants are operating at maximum possible capacity. They still have external and internal constraints. The external constraints relate to the concentration of deuterium in the feed gas and this situation is not remediable any further. The fertilizer plant managements have cooperated in upgrading the deuterium, within the constraints of the technology of the ammonia plants of earlier years.

The internal constraints, however, are expected to be removed shortly as the equipment for the same are being installed. In any other part of

the world, these would be treated as pilot plants. Full capacity utilisation would not be expected even in the first-generation industrial scale plants but only from plants of subsequent designs, as improvements will have to be effected at appropriate levels based on experience. In India, however, it has been possible not only to bring the first plants as close to the design capacities as possible, but in addition absorb the technology to design new plants entirely indigenously.

The heavy water plant at Thal, in Raigad district of Maharashtra, comprising two streams each of 55 tonnes/year capacity, has been engineered in India. The Department of Atomic Energy provided the basic process technology and Projects Development of India Ltd., a public sector firm, carried out the engineering. The plant is based on the monothermal ammonia-hydrogen exchange process, as in Tuticorin. Its feed material is synthesis gas from the ammonia plants of the Rashtriya Chemicals and Fertilizers Ltd. (RCF) at Thal.

Considering the need for close interaction and coordination between the ammonia plants and the heavy water plant, it was decided that the heavy water plant also would be operated by RCF. Taking into account the excellent track record in project management of RCF, the construction responsibility was also entrusted to it as this would make for a smooth transition to the operational phase. The confidence placed in RCF has been justified by the completion of the project ahead of schedule and within the original cost estimates. The plant went into trial operation on October 28, 1986.

As in Tuticorin, the plant operates at a high pressure of 250 kg/cm² and at a low temperature of (-)27°C. The cracking of ammonia into synthesis gas is done at a pressure of 150 kg/cm² and 550°C. The thick-walled vessels and towers were fabricated indigenously for the first time using state-of-the-art technology. All equipment and package units, except compressors, were procured indigenously. The heart of the process lies in the high efficiency exchange trays and these too were engineered and fabricated in India, with inhouse data.

However, it will be some time before the plant reaches full capacity as operational experience has to be acquired in the coordination of two large ammonia plants with two large

heavy water plants calling for proper adjustments and responses to disturbances in either plant. Additional care is required in the operation of the ammonia plant as synthesis gas is used for production of heavy water. Impurities, which are of minor concern in ammonia production, can paralyse the heavy water plant if not controlled within design limits.

The operating personnel of both plants have to progressively become familiar with these requirements. Given the high quality of the operating personnel, before long the two plants will operate in unison the way Baroda and Tuticorin plants are operating today.

Based on the success in the construction and commissioning of the Thal plant, the Government has sanctioned an identical plant, in conjunction with the fertilizer plant of Kribhco at Hazira in Gujarat. Similar management arrangements are being adopted for this plant also.

New route

Recognising the trend in the fertilizer industry towards single stream plants and their effect on stream factor and cost of production of heavy water, the DAE initiated pilot plant studies to render the heavy water plants of this technology, independent of the fertilizer plants. A pilot plant for extraction of deuterium from water by the water-ammonia exchange process, set up at Baroda, has satisfactorily established the conditions for such a process and the same is proposed to be engineered in detail with the aid of the Indian consultants. This technology will be adopted not only for the future plants but also for extending the life of the existing units based on ammonia-hydrogen exchange process, be it mono-thermal or bi-thermal.

While the technology for the ammonia-hydrogen exchange was first imported and then absorbed, that for the hydrogen sulphide-water exchange process has all along been indigenous and was implemented in the Kota plant. There were many problems in setting up the plant such as stoppage of supplies of critical equipment from abroad on account of safeguard considerations and the difficulties encountered by the Indian manufacturers in conforming to the stringent specifications. Besides the technological novelty of deuterium extraction, the toxicity of hydrogen sulphide and the highly corrosive en-

vironment created by the presence of hydrogen sulphide and water in the plant, complicated the design and engineering of the plant.

Considering that the nuclear power station supplying steam and the heavy water plant at Kota were the first of their kinds, the operation of the latter has been extremely satisfactory. The plant is designed for operation at a relatively low pressure of 20 kg/cm². Even this pressure is significant on account of the stringent criteria for leaktightness of the system, containing hydrogen sulphide gas. The permissible level of hydrogen sulphide in the environment is less than 10 ppm and the plant has an inventory of 100 tonnes of hydrogen sulphide. Though the plant and equipment and piping were fabricated and installed to the most stringent specifications, it was considered advisable to operate the plant at a lower pressure initially, incorporate modifications where necessary and make sure that all parts, including the internals, are safe enough before the plant was taken to higher pressure.

The operating experience, at the low pressure of 10 to 12 kg/cm², has been satisfactory and the plant's performance has come up to the design expectations. Recently a complete inspection and overhaul of the plant was done. While by and large the equipment have not undergone any degradation, despite four years' exposure to hydrogen sulphide and moisture, certain observations have provided valuable information to improve equipment performance not only at Kota but more so in the Manuguru plant, under construction in Khammam district of Andhra Pradesh.

To ensure high stream factor, an independent steam generation plant has been sanctioned by the Government and is expected to be in position in 1988. With this, the plant is expected to reach its design capacity as no further constraints will restrict production.

Manuguru's advantages

The Manuguru plant comprises two streams, each of 87 tonnes of heavy water per year. The steam is supplied by three boilers of 275 t/hr. and power is produced from extraction turbine generators of 30 MW each. Except for the most sophisticated valves, all the static equipment and much of the moving equipment have been fabricated indigenously. The boosters, handling hydrogen

sulphide, have been manufactured by the public sector BHEL at Hyderabad. The project is expected to be completed by April 1988. Initial production will start by the third quarter of 1988.

With the capacities already established and under construction there is total assurance of availability of heavy water for the nuclear power profile till 1994 by which time additional capacities have to be brought in based on either of these technologies, incorporating such improvements as become available, with the operational experience.

/13104

CSO: 5150/0103

COMMENTATORS MAKE CASE FOR NUCLEAR WEAPONS

Confidence-Building Measure

Bombay THE TIMES OF INDIA in English 28 Feb 87 p 8

[Article by K. Subrahmanyam]

[Text]

THE US ambassador in Islamabad, Mr. Hinton's speech at the Pakistan Institute for Strategic Studies last week advising Pakistan to sign the Non-Proliferation Treaty in its own interest and warning it that its quest for nuclear weapons capability might jeopardise the next tranche of military aid which is to come up for discussion before the US Congress next month has evoked considerable interest in this country. And as if in response to this statement, President Zia is reported to have said while leaving Jaipur that Pakistan did not intend to sign the Non-Proliferation Treaty and was confident that the military aid package (including the AWACS element) will get through the US Congress.

Mr. Hinton's is not the first warning to Pakistan by an ambassador stationed in that country. His predecessor, Mr. Ronald Spiers, too, delivered a similar speech at the Pakistan Institute for International Affairs. The Pakistanis took it in their stride and the US Congress accepted the ritualistic annual certification by President Reagan that Pakistan did not possess a bomb or explodable nuclear device.

However, Ambassador Hinton has rightly drawn attention to the fact that this year the presidential certification alone would not be adequate and the waiver of Symington Amendment, which prohibits the US government from extending military aid to any country believed to be developing nuclear weapons, has to be done by Congress. This is so because in 1981 Congress allowed

a waiver for six years subject to an annual certification by the President. That period is now expiring and Congress has to extend it for a further period subject to such conditionalities as it may deem appropriate. Congress could, if it so decided, refuse the waiver.

Higher Priority

The possibility of Pakistan signing the Non-Proliferation Treaty can be ruled out. Pakistan refused to knuckle under President Carter's pressure in 1979 when he invoked the Symington Amendment and cut off all aid to Pakistan. The US administration climbed down in 1981 when it accorded a higher priority to keep the Mujahideen in Afghanistan supplied with arms than to the cause of non-proliferation. So the crusaders for non-proliferation looked away as Pakistan advanced steadily towards nuclear weapons capability.

Since 1981 the Israeli nuclear weapons programme has come out into the open after having remained open secret for well over 12 years. Mordechai Vanunu, the technician from the Dimona nuclear facility, has disclosed the details of the Israeli programme. As was only to be expected, supporters of non-proliferation in the US are thunderously silent on this issue.

Over the years the Israelis had been able to apply pressure on the US to supply them sophisticated conventional arms by threatening to unveil their nuclear weapons. Paki-

stan has followed Israel's example. Thus there is no reason why the US should not accept a Pakistani nuclear arsenal just as it does an Israeli one so long as Islamabad, like Tel Aviv, does not conduct an explosion.

Further, the pundits of the Washington strategic community have come out with a theoretical justification for endorsing small nuclear forces for Israel and Pakistan. Both are anti-Soviet in their orientation and therefore their nuclear arsenals would not affect adversely US interests. In fact, a nuclear-weapons-capable Pakistan can play a more effective role in alignment with US strategic consensus in the Gulf than a non-nuclear one always worried about India. The US administration's proposal to provide Pakistan the AWACS system cannot be related to Afghanistan and can be rationalised only in terms of assigning Pakistan the role of a virtual ally. The AWACS are not meant to be transferred to non-aligned non-allies.

Arms Supplies

Pakistan also has increased its bargaining power vis-a-vis the US on keeping up the arms supplies to the Afghan Mujahideen. The Najibullah government and the Soviet Union have initiated a ceasefire and a number of other measures to de-escalate the conflict. The disparate groups of insurgents are unable to unite even at this stage. Consequently any US attempt to keep the insurgents fighting in Afghanistan, using Pakistan as a conduit for arms

supplies to them, gives Islamabad an additional leverage.

The US and the rest of the world must know that there is no way of turning the clock back and stripping Pakistan of its nuclear know-how and incipient arsenal. The arms supplies and economic aid to Pakistan can only postpone the date of that country going nuclear publicly. That is about all the US is likely to attempt and it will be totally irresponsible for anyone in India or elsewhere to assume that Pakistan can be de-nuclearised credibly and reliably.

Ambassador Hinton's speech has, therefore, to be interpreted against that background. The US intends to go through the motions of persuading Pakistan to stop short of going nuclear publicly and to reward it with additional military equipment (including the AWACS) for its permitting US to do so. India will be told that Congress is going to be severe in its scrutiny; elaborate hearings will take place. We will be advised not to take it for granted that Pakistan will get the arms and asked to moderate our outcry. At the end of it all, it will be declared that as a result of the information disclosed in various executive sessions, Congress is satisfied that withholding arms (including the AWACS) from Pakistan will enhance the risk of its going nuclear.

All in all the world in general and

India in particular have to prepare themselves for a continued accumulation of its nuclear arsenal by Pakistan on the one hand and approval of the next tranche of US armaments for it on the other. This will be the most prudent assumption for any responsible Indian security planner.

In President Zail Singh's speech at Parliament of February 23 there is a mention of Pakistan's clandestine nuclear efforts being one of the hurdles in the way of India normalising relations with that country. This formulation needs to be carefully re-evaluated. If the contention that there is no way of deflecting Pakistan from its course is accepted as valid, then it will be counter-productive to treat Pakistani acquisition of nuclear weapons capability as an obstruction to normal relations. In such a situation the realistic approach would be to accept Pakistan as a nuclear weapons power and develop normal relations with it. History shows that the development of nuclear weapons capability among nations having an adversarial relationship has led to stability; this has happened in central Europe and on the Sino-Soviet border.

Political wisdom lies in accepting the inevitable and planning for safeguarding our national security and interests in the light of that inevitability. In fact, an acceptance of Pakistan's nuclear reality and the exercise by India of its nuclear option, not publicly but in the same

ambivalent fashion as Pakistan and Israel have done, will throw open a new vista of confidence-building measures both in the nuclear and the conventional field. An Indian declaration that we propose to deal with Pakistan as a nuclear weapons power can also make it more difficult for the US Congress to approve further arms transfers on the plea that these will still persuade Pakistan not to go nuclear publicly.

Equal Terms

Confidence building measures between two nations tacitly acknowledged to be nuclear are different from those between non-nuclear countries. While there may be reservations to accept equal rules between a non-nuclear India and a non-nuclear Pakistan, a tacit acknowledgement of each other's nuclear capability will have an equalising effect. Attempts at chasing the mirage of persuading Pakistan not to go nuclear have not only proved futile but have also generated tension and distrust. Once we accept the reality and adjust ourselves to it and start formulating a policy on that basis, we are likely to find it is easier to negotiate with Pakistan. In that event, the Pakistanis will also shed their complex vis-a-vis India and realise that India has no choice but to deal with them in terms of equality which has been the Pakistani objective for the last four decades.

Need To Follow Own Interests

Bombay THE TIMES OF INDIA in English 28 Feb 87 p 8

[Editorial: "The Pakistan Bomb"]

[Text]

We carry in adjoining columns an article by Mr. K. Subrahmanyam arguing that a new and firm basis for peace between India and Pakistan can be established if New Delhi acknowledges that Islamabad has acquired a nuclear weapons capability and if it simultaneously exercises its own option in this regard. This constitutes a major critique of the policy this country has pursued since the late seventies when it became known that Pakistan was engaged in a determined bid to acquire nuclear weapons. In sum, while adhering to its earlier decision to abjure nuclear weapons, India has been asking the United States to use its considerable influence in Islamabad to persuade the latter to give up its plans. This approach has not worked. Indeed, it could not have worked for two obvious reasons. First, Pakistan is not a U.S. satellite; it is capable of pursuing its

own interests, as it perceives them, fairly effectively; its record speaks for itself. Secondly, Washington does not oblige Islamabad when it extends military aid to the latter; the U.S. needs Pakistan as much as Pakistan needs it. So it could be easily anticipated that the Reagan administration would turn a blind eye on Pakistan's nuclear programme and that the U.S. Congress would agree to waive the Symington Amendment which forbids U.S. military assistance to countries, that are engaged in such an effort, in respect of Pakistan. This is not to argue that Washington could not have developed an alternative policy frame which would have denied Pakistan a key role in its strategy for the region. But that would have involved, especially in the context of the Islamic revolution in Iran and the Soviet military presence in Afghanistan, a revolution in U.S. policy which it would be wholly unrealistic to expect.

The United States and Pakistan have, as was only to be expected seized on the weakness of the Indian position to press the point that Islamabad is ready to sign the Non-Proliferation Treaty provided New Delhi agrees to do the same, or alternatively to agree to mutual inspection. India's official spokesmen have not met this challenge in a convincing manner. They have generally contended themselves with the assertion that Pakistan's programme to acquire weapons constitutes a major obstacle in the path of Indo-Pakistan friendship, that America's failure to restrain Islamabad violates its commitment to non-proliferation, and that these developments oblige it (New Delhi) to keep its own options under review. The inconsistency of this stand is obvious and cannot but expose India to continued U.S. pressure to sign the Non-Proliferation Treaty.

Indian policy makers have to ask themselves and answer certain questions. How vital, for example, is it for them to try and persuade Pakistan to abandon its search for the bomb? Is it at all possible for them to persuade Pakistan to do so? If not, is it not time that they gave up the self-imposed restraint and undertook a similar effort? If yes, what are they prepared to offer Pakistan in return? Clearly there is genuine scope for differences of opinion on these and related issues. But it should be obvious that we must not allow ourselves to be unduly influenced by the U.S. policy. It is common knowledge that Americans have assisted Israel in its nuclear weapons programme. True, we cannot blame the U.S. administration for the unofficial assistance. But it has acquiesced in the Israeli programme. So its opposition to proliferation is rather selective as is its concern for human rights. That, however, is not a matter of central concern to us. The pertinent issue for us is that America has its own reasons to be concerned over the acquisition of nuclear weapons by Pakistan and India. Pakistan should cause it graver concern than India in view of the former's Islamic connections which can impinge on Israel's security. That may explain both the Israeli interest in India destroying the Pakistani facilities at Kahuta and the frequent exposures of Pakistan's nuclear successes in the U.S. press. All this does not establish an identity of interests between us on the one hand and the Israelis and the American opponents of the Pakistani bomb on the other. We have to be guided by our perception of our interests which unfortunately the government has not cared to define all these years.

Indian Options Limited

New Delhi PATRIOT in English 3 Mar 87 p 4

[Editorial: "Thoughts on the Pak Bomb"]

[Text]

The issue of military intent in Pakistan's nuclear programme could not possibly have been kept under the wraps for long by 'cricket diplomacy' and all the concomitant noises of peaceableness emanating from Gen Ziaul Haq. It cannot be swept under the carpet for the sake of a piecemeal policy of 'normalisation'. The issue has been pushed to the very edge of the foreground by several recent authoritative disclosures and reports, besides the statements, sometimes conflicting on purpose, being made by Pakistan's nuclear scientist Abdul Qadeer Khan. Pakistan has advanced its military nuclear aims to the point where it can use the bomb both for diplomacy and military blackmail. The Islamabad junta wants to extract the maximum profit out of the access it has gained to military nuclear capability. That is why its statements are alternately truculent and discreet. Islamabad is engaged in an elaborate exercise in deception. With verbal disavowal of military nuclear intent it offers a flimsy alibi for the Reagan administration to continue an accelerated programme of US military supplies to Pakistan. At the same time Pakistan threatens India with the revelation that the nuclear weapon in its possession will be used in a Pakistan-India conflict.

What this spells for India in particular (despite the unconvincing disclaimer from Mr Khan) is clear, too: a dire threat to this country's security, the imperative need for its unblinkered recognition, as well as for an expeditious second look at its own options in this context. The nuclear policy of this country has been a mat-

ter of public record and its reiterations have been much more than merely ritualistic. It has been repeatedly stressed that India is fundamentally averse to exploitation of nuclear energy for any but peaceful purposes. But India cannot afford to ignore indefinitely the threat to her security. This is a cruel world and this country's options are limited. Those options should have been weighed carefully and a firm decision pursued. It is absurd to predicate our security policy on the assumption that the US Congress would cut off aid to Pakistan and that the fear of loss of US munificence would deter Islamabad from pursuing the bomb. The US has not denied aid to Israel and South Africa, both of which are known to have obtained access to atomic warheads. There is no reason whatsoever to believe that the US Congress will block Pakistan's military nuclear programme. The concept that someone else will unfurl a protective "umbrella" to save this country from nuclear blackmail is a proven myth. In any event, this as an option has not been pursued.

India's approach needs to be freed from cobwebs of confusion, if the task is to be facilitated with the sense of emergency it demands. The right response can only be impeded by an inadequate recognition of Pakistani intention and capacity to acquire nuclear-weapon capability, or by a grossly exaggerated notion of the ability of the American public opinion, over which the Reagan regime has repeatedly ridden roughshod in defence of its special South Asian client, to restrain Islamabad. The options for India are, in a word, limited; and the fact needs to be faced.

/9274

CSO: 5150/0097

NOORANI SAYS 'NO DESIRE' TO MAKE ATOMIC WEAPON

BK170105 Karachi Domestic Service in Urdu 1700 GMT 16 Mar 87

[Text] Minister of State for Foreign Affairs Zain Noorani has reaffirmed that Pakistan's peaceful nuclear program will continue, no matter whatever difficulties we may have to face. This was stated by him while speaking on two adjournment motions sought to be moved separately by Tariq Chaudhry and Maulana Kausar Niazi which were related to U.S. ambassador's remarks on Pakistan's nuclear program.

Zain Noorani said that Pakistan's nuclear program is completely for peaceful purposes. He stressed that Pakistan is not making any atomic weapon, and it has no such desire at present.

The House chairman ruled the motions as out of order. The House also dealt with other two adjournment motions and it will resume session tomorrow morning.

/6091

CSO: 5100/4728

'CREDIBLE' STANCE ON NUCLEAR ISSUE SHOULD BE ADOPTED

BK161502 Islamabad THE MUSLIM in English 3 Mar 87 p 4

[Editorial: "Bomb Controversy"]

[Text] Predictably, Dr. A.Q. Khan's meeting with the well-known Indian journalist, Kuldip Nayyar, seems to have created quite a stir. Interviews with the 'father of the Pakistani nuclear programme' are quite rare and this, the first with a foreign journalist, was bound to have wide repercussions. While Dr A.Q. Khan's denial will probably contribute more to creating confusion rather than clarifying his candid comments on the nature and progress of our nuclear programme, its significance needs to be measured by two aspects. Firstly, its timing and, secondly, its contents. In terms of timing, the interview comes at a time when Pakistan has been facing a two-pronged threat: One from the Indians, who have raised the temperature on the borders, and the other from the Americans through their Ambassador in Islamabad who has been trying, quite unsuccessfully it seems, to bully and browbeat us on this issue. Additionally, there is the related aspect of peaceful overtures from the Soviet Union which have generated hope and optimism on a political settlement in Afghanistan.

The contents of the interview are not surprising and probably tend to confirm what people in Pakistan had generally felt and what others in the outside world have suspected. Pakistan's

official hush-hush approach on this issue is largely governed by tactical considerations in not annoying the Americans, the Indians, and the Israelis. Shorn of all verbiage, the message given by Dr. A.Q. Khan through his interview to Kuldip Nayyar is directed against all these detractors of Pakistan's "Islamic Bomb". To the Indians it is a "hands off Pakistan" message at a time when New Delhi has been carrying out massive warlike exercises all along our eastern border. Concurrently, it is a signal to the Americans not to link the nuclear issue with the aid package since the former is now fait accompli. There is also no doubt that the American Ambassador's recent pronouncements on the nuclear issue link American hardening on this issue with a possible Pakistani softening on the Afghan question. For too long, the Government here has been denying what is obvious to most. On the nuclear issue, as also on other issues affecting the security of Pakistan, the government needs to take the people into confidence and adopt positions that are credible and consistent with the national interest. We feel the national interest has been served by the message emitted from Dr. A.Q. Khan's interview. The Government need not feel unnecessarily defensive or peevish on this issue.

/6091

CSO: 5100/4728

ABDUL QADIR KHAN SETS 'RECORD STRAIGHT' ON INTERVIEW

BK161058 Islamabad THE MUSLIM in English 2 Mar 87 p 1

[Text] Islamabad, March 1 — Eminent nuclear scientist, Dr Abdul Qadir Khan, in a statement here today denied having granted an interview to Indian journalist Kuldip Nayyar. He described the words attributed to him as mischievous, false, and concocted and an attempt to malign Pakistan.

Dr Qadir reiterated that Pakistan's modest nuclear research and development programme "is solely for peaceful purposes."

Following is the text of Dr Qadir's statement.

"My attention has been drawn to an article in some newspapers by an Indian journalist, Mr: Kuldip Nayyar, containing an alleged interview with me. The article is mischievous, false, and concocted and is an attempt to malign Pakistan.

"I never gave an interview to Mr Kuldip Nayyar and never used the words attributed to me.

"To put the record straight, a Pakistani friend of mine living in Islamabad came to my house some 1-1/2 months ago to deliver an invitation for his marriage ceremony. He was accompanied by a person unknown to me and who was introduced as Mr Nayyar.

Since my friend had come personally to deliver the invitation, as a matter of courtesy I asked him to have a cup of tea with me. While having tea Mr Nayyar, who I then learnt was Mr Kuldip Nayyar of India, asked casually my views about Pakistan's nuclear programme. I told him about Pakistan's policy of its readiness to sign nuclear non-proliferation treaty simultaneously with India and to renounce the manufacture and use of nuclear weapons. In response to a question I also told him that Pakistan's policy on this subject had been reflected, in unambiguous terms, more than once by our Prime Minister, Mr Mohammad Khan Junjo.

"As stated earlier, this coincidental meeting with Mr Kuldip Nayyar was without prior arrangement. The disclosure of this informal meeting and discussions by Mr Kuldip Nayyar is a breach of trust and is professionally unethical. I regret to say that he has misused my hospitality and he unfortunately, indulged in unfair and bad journalism.

"I want to reiterate that our modest nuclear research and development programme is solely for peaceful purposes and is geared towards meeting our energy requirements for a fast growing industry.

/6091

CSO: 5100/4728

COMMENTARY URGES ENQUIRY INTO ALLEGED KHAN INTERVIEW

Lahore THE PAKISTAN TIMES in English 6 Mar 87 p 6

[Text]

The fake interview of a Pakistani atomic energy scientist with an Indian correspondent has had its reverberations throughout the world. The point of prime interest is the statement that Dr. A.Q. Khan had been misquoted by the Indian journalist and that the statement attributed to the scientist had never been made. The point of second interest is another statement by Dr. Khan that a friend of his had brought the Indian correspondent to his house ostensibly for inviting the scientist to his wedding ceremony. The meeting, therefore, was firstly never planned. Secondly, whatever the scientist said over a cup of tea to the correspondent was in trust and its disclosure a breach of trust apart from being professionally unethical. Thirdly, the contents of his so-called interview were factually wrong and he had been misquoted which amounted to misusing his hospitality.

Another statement disclosed that Dr. Khan had earlier knowledge of the Indian correspondent's visit and had agreed to talk to him. In pursuance of a call the scientist had consented to socially receive the Indian correspondent and have a cup of tea with him. The next link in the episode is a statement by a number of journalists stating that it was the Editor of an English daily from Islamabad who had arranged the meeting. According to the statement the Editor had even tried to implicate a news agency which is said to have interviewed the scientist. The news agency denied this and made a statement that no such interview had been creeded by it. The statement by the journalists asserted that soon after the publication of the fabricated interview the Indian Ambassador to Pakistan had visited the Editor which was not the first meeting between them.

We are not in a position to comment on the culpability of

any one involved in this episode but we cannot help observing that this is indeed a sordid affair. We have asserted many a time that the freedom of Press was a concept to be exercised within the four walls of Pakistan's interests. Anything which harmed the interests of Pakistan and its teeming millions could not be covered under the plea of freedom of Press. Further, we cannot refrain from pointing out that a true scientist shuns publicity; he is a hermit confined to his laboratory or

his tools of experiment away from the humdrum of political currents and cross-currents. Dr. Khan's outbursts have over the years been too frequent which is against the temperament of a scientist.

We would urge the authorities to institute an impartial inquiry joining everyone involved in this shabby affair. Let there be no exception and let all links in the chain come to limelight. This inquiry might reveal more scandalous facts.

/9317

CSO: 5100/4729

BRIEFS

REPORTED 2D ATOMIC PLANT IN ISLAMABAD--According to details now available about yesterday's report in the British newspaper, THE OBSERVER, Pakistan has two atomic plants which can produce weapons-grade uranium. Besides the one at Kahuta, there is a second one reported to be in Islamabad. The report quoted a leading scientist of Belgium, Dr Brabers, who was the Pakistani nuclear scientist Dr Abdul Qadir Khan's teacher. Dr Khan is reported to have told Dr Brabers that Pakistan has enough material for an atom bomb and the job can be done in a month if the government decides to go ahead. [Text] [Delhi Domestic Service in English 0240 GMT 16 Mar 87 BK] /6091

LAHORE-SINKIANG ANTINUCLEAR MARCH--Lahore, March 4--Human Rights Society of Pakistan will launch a campaign to create resentment against proliferation of nuclear weapons which are constant threat to human life on earth. The President of the Society, Begum Mehnaz Rafi, and General Secretary Ch Ijaz Ahmed told a news conference on Wednesday that the Society will organise a peace march from Lahore to the Sinkiang border of China. A four-member team of youth--Irfan Sadiq, Arif Khan, Syed Saulat Ali Naqvi and Hamid Mehmood Joea of Fine Art Department of the Punjab University--will take start from Lahore in the first week of April. They will cover 1000-meter distance on foot in a period of two months. Begum Mehnaz Rafi said the superpowers were exploiting their nuclear capability to manufacture nuclear weapons and establish their supremacy on each other. They have virtually indulged in a race to build potential nuclear weapons. The participants of the peace march will carry placards and banners expressing resentment against the spread of nuclear weapons. They will seek permission from the Chinese authorities at the border to continue their peace march inside China. [Text] [Lahore THE PAKISTAN TIMES in English 5 Mar 87 p 8] /9317

KARACHI PLANT PRODUCTION FIGURES--The Karachi nuclear power plant produced electricity at 82.5 percent of capacity for the first time last year and completed 10 years of operation with a fully Pakistani technical staff and without external assistance. The plant achieved a record total production of over 527.4 million units of electricity last year. [Text] [Karachi Domestic Service in Urdu 0200 GMT 2 Mar 87 BK]

/9716

CSO: 5100/4726

PROGRESS OF NUCLEAR RESEARCH OUTLINED

Ikeja NEWSWATCH in English 16 Feb 87 p 8

[Article by Wale Ajao]

[Text]

Nigeria joined the nuclear race eleven years ago, when the Obasanjo administration established nuclear research centres at Ife and Ahmadu Bello universities. The two centres received a N3 million start-off fund at inception in 1976. The University of Nigeria, Nsukka and the University of Sokoto later joined the search for alternative energy with solar energy research centres. The Shagari administration gave the four centres N11 million. The present Babangida administration also chipped in some money. In 1986, it gave them N3 million.

But nearly eleven years and N17 million later, the country's energy research is still very much on paper. Nothing significant has been achieved.

A piece of land, about 300 square metres, allocated to the nuclear energy research centre at Ahmadu Bello University, ABU, is still uncleared. Suleiman Lamina, an employee of the centre, said the land allocated for the centre has not been cleared because it would not be right to spend the money allocated for the nuclear energy research programme on building offices and laboratories when the laboratory equipment are not available. He said that plans are being made to see that by the time the trainees sent abroad return, the site will be cleared and developed.

Another spokesman of the centre, who said he wants to remain anonymous, said part of the problem is that not enough money has been allocated for the programme. He said there is a difference between what is allocated and what is released to the centres.

Finishing touches are being made to the nuclear energy research centre at Ife.

Completion of the buildings was delayed because an indigenous company handling the N179,000 contract made away with part of the money. The contract was re-awarded to Soleh Boneh in 1985.

The nuclear energy research programme at ABU is being conducted on a temporary site behind the physics department. No standard equipment used in nuclear energy research such as accelerator and reactor isotopes are available. The temporary site has only one neutron generator which cannot be installed because the centre has no special refrigerator required to store the fuel to be used by the generator.

In the last ten years, the ABU centre has sent 20 students overseas for training. All of these are expected to come back with a Ph.D degree in various aspects of nuclear physics. Yet, according to an expert, who wants to remain anonymous, what the centre needs more are technicians. When the 20 students return, they will not have enough technicians to work with. In other parts of the world, each nuclear research centre has two technicians to one academic. The technician services equipment used by the researchers.

Attempts made by the ABU centre to train technicians have failed. Even secondary school leavers were at a point involved in the centre's desperate drive for manpower. But one after the other, the trainees absconded and went after greener pastures. The centre at Ife has trained 35 personnel. About 20 others are in Europe and US still learning the rubrics of nuclear energy research.

Explanations over this state of nuclear energy research in Nigeria are difficult to come by. Most of the personalities involved in the programme are keeping mute

about why things have not gone well with the programme. Shamsudeen Babatunde Elegba, a senior lecturer, is the director of the ABU centre. Elegba said that the programme is still in the pipe-line but there is nothing to discuss about it. As he put it: "There is nothing to talk about as at now. You do not give a person raw beans to eat." Asked to explain what he meant, he said: "When we are off the ground, you will know."

At the ministry of science and technology, nobody was prepared to discuss the programme. The ministry co-ordinates the research programme.

When Akin Mustapha, the director of the Ife centre, talked to *Newsweek* at Ife, he could only feed the reporter with common place facts. "I think you can see the building for yourself," Salau said, adding "but why do you have interest in writing about us? This is not a programme the press should cover. Go to Germany, Pakistan, Bangladesh and Indonesia, see what they are doing there and come and tell us here."

Emmanuel Emovon, minister for science and technology, has been quoted as saying that Nigeria's mastery of nuclear technology is at hand, a remark that gave many people a vague sense of hope. But Emovon does not think his statement means more than he said. He told *Newsweek* in his office: "I want to state here that by saying that our mastery of nuclear energy is a matter of time, I mean it may take five or ten years or less before we actually run the centres into operation."

The problems facing nuclear energy research in Nigeria are many. Notable among them is finance. The total of N17 million spent on all the energy research centres in a decade is grossly inadequate,

according to an expert. In the United States, \$39 million was spent on nuclear energy research programme in five years, 1939 to 1945. The high cost of equipment which are imported constitute another problem. A reactor which cost \$2 million in 1982 now costs \$5 million. It is against this background that Tam David-West, former minister of mines and power, suggested that only one centre should be established at first. His suggestion was dismissed.

While Nigeria's nuclear energy programme is proceeding slowly and unsteadily, other countries continue to use nuclear energy in various aspects of life. The Chinese use nuclear energy in medicine and agriculture; for X-ray and food preservation respectively. According to the International Atomic Energy Agency, IAEA, 374 nuclear reactors are connected to the electricity supply network in 26 countries among which are Germany, France and the Soviet Union. All these nuclear energy stations have a generating capacity of 248,000 megawatts and produce 15 percent of the world's electricity. Perhaps, this is why despite the nuclear disasters in Britain in 1957, in America in 1977 and Chernobyl in 1986, all of which claimed 30,000 lives, nuclear plants are still being established.

One controversial use of nuclear energy is in war. But Emovon does not favour this. "Nigeria," he said, "should acquire nuclear technology for peaceful purposes only." He said that Nigeria should base its nuclear energy research on its domestic needs rather than as a response to real or imaginary threat of attack from whatever quarter. "In short," he said, "our energy research programme is based on peaceful purposes only."

/13046

CSO: 5100/32

PAKISTAN'S 'NUCLEAR AMBITIONS' ASSAILED

Alleged U.S. Involvement

LD141535 Moscow Domestic Service in Russian 0930 GMT 14 Feb 87

[Text] According to foreign press reports, Wazir Ahmed Jogeza1, deputy speaker of the National Assembly of Pakistan, has stated that it is necessary to create a Pakistani nuclear bomb. This statement is commented on by international journalist Vladimir Solovyev:

[Solovyev] The nuclear ambitions of certain circles in Pakistan are viewed with particular caution against the background of the positive changes that have appeared lately in Indian-Pakistan relations. We recall that, in the course of 5-day talks at the level of secretaries of the Internal Affairs Ministries of India and Pakistan, an agreement was concluded in New Delhi, permitting tension between the two countries to be alleviated.

The Indian press particularly stresses that both countries have agreed and adopted pledges not to undertake any aggressive actions against each other. In this situation, when the necessity to advance further along the path of the normalization of relations has been identified, the statement by Wazir Ahmed Jogeza1 about a Pakistani nuclear bomb sounded like an obvious dissonance. Wazir Ahmed Jogeza1 proposes that nuclear weapons should be seen as a boon. In particular, he attempts to prove that Pakistan's intended nuclear program is necessary, for the effective defense of its borders. What can one say about this? Such assertions contradict the increasing understanding among people on various continents, including Asia, that genuine security can be achieved by eliminating weapons rather than by piling them up. This is particularly true of nuclear weapons, which are now perceived throughout the world as the most dangerous threat to the survival of humanity. And if there are some people who do dare to argue for this axiom of the nuclear age they are to be found in Washington.

They try to justify the invention of the most destructive types of nuclear weapons, the implementation of the SDI program and the continuation of nuclear tests in Nevada by citing the supreme reason that security should be ensed.

The similarity of the statements by the hawks and by the deputy speaker of the National Assembly in Islamabad shows that extremely dangerous U.S. concepts are penetrating Pakistan along with the torrents of U.S. weapons.

Symington Amendment Recalled

LD272313 Moscow TASS in English 2007 GMT 27 Feb 87

[Text] New Delhi, 27 Feb (TASS)--TASS correspondent Sergey Karmalito reports:

Indian Foreign Minister Narayan Dutt Tiwari expressed the hope that the U.S. Congress would reject the Reagan administration's request to repeal the Symington Amendment with respect to Pakistan, banning military aid to a country implementing a nuclear arms programme. Asked today by deputies to the parliament's House of the People who expressed concern over these intentions of the White House and over reports that Pakistan became a nuclear-threshold state, he called attention to the words by Dean Hinton, who, completing his round of duties as the U.S. ambassador to Pakistan, had said the other day that he could not get Islamabad to abandon its nuclear ambitions.

The Indian Government hopes that D. Hinton's opinion will be heard in the "corridors of power" in Washington and that the U.S. public and Congress will not agree to a repeal of the Symington Amendment, said the minister.

The local press points out that the amendment's repeal is necessary to Washington to open the way to another military and political deal with the Islamabad regime worth 4.02 billion dollars. As a result of a previous such agreement to the tune of 3.2 billion dollars, Pakistan was lavishly supplied with fighter bombers, helicopter gunships, tanks, field guns, and missiles.

During today's debate parliamentarians expressed a serious concern over new evidence of the military edge of the Pakistani nuclear programme. N. D. Tiwari assured deputies that the government was closely watching the developments and would take adequate steps in case Pakistan makes nuclear weapons.

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CSO: 5100/19

THERMAL PLANT WORKERS AFFECTED BY RADIATION

Istanbul HURRIYET in Turkish 17 Nov 86 p 14

[Text] Ankara (HURRIYET)--As radiation-carrying clouds skirted Turkey in the wake of the accident at Chernobyl, there was no threat to Kangal District in Sivas. The residents of the district, therefore, took little interest in Chernobyl. Nor did a check that the provincial governor ran to see if the hazelnut crop within the district had been affected by radiation cause much stir. Thus, the Chernobyl incident was confined to an opportunity for a "mental exercise" for some teachers and intellectuals in Sivas.

Chernobyl is a long way from Kangal. But they had one thing in common: in both places, some events were kept under wraps for a while. In Chernobyl, it was the party that immediately took command of the incident. That is, until a Swedish detection post sensed a substantial increase in atmospheric radiation. Up to that point, nobody had any idea that something calamitous was going on in Chernobyl.

In Kangal, by contrast, there was not even a party to take command of the situation. At first, nobody took the matter seriously. Until, that is, some people happened to enter a room and a geiger counter there burst into song all at once.... Subsequent events developed along the lines of a comedy. And so they have been doing ever since.

On the night of 27-28 October, all was normal in Kangal--so normal, in fact, that nobody showed even the slightest inclination to keep a record of what happened at the construction site of the Kangal Thermoelectric Station that night and thereby spoil its tranquil beauty.

That night, five young people "with specialist training" picked up an instrument known as a "192 Gamamat" to check the weldings connecting gigantic boilers together. Climbing up to do their job, they had no thoughts of Chernobyl or anything of the sort. Their job that night was to check some recent welding at a height of 60 meters. As the boilers of the thermoelectric station would be subjected to great heat and pressure in operation, they needed to be checked by X-rays.

The senior member of the group was Siddik Gumus; he had been employed by the Kutlutas company at its thermoelectric station construction site in Sivas for 2 years. Salt Cakmak and Mustafa Bergil had been working at the same place for 9 months. Senol Kale was a newcomer who had been there for only 20 days.

While working at a height of 60 meters that night, using the "192 Gamamat" welding checking instrument, they did not take it at all seriously that the device was working intermittently. They began fiddling around with the hose connecting the business end of the device with the main body of the instrument. As they did so, the hose came off suddenly and five or six metal ball bearings fell out, dropping to the ground 60 meters below. Siddik Gumus had been doing this work for 2 years and had never been faced with a situation like this. As the senior member of the group, he took stock of the situation and said, "We had better resume our work tomorrow." Nobody had the authority to disturb the tranquil night either for Sivas or for those responsible for the construction site.

In Kangal District the next day, there was none of the atmosphere reminiscent of that in the film "The Day After" in a nuclear war. The five workers whose instrument had broken down arrived at the base of the boiler where the "balls" had fallen, and Senol Kale picked them up where they lay on the ground and put them in his pocket. Then they went about their normal work--until, that is, they entered a room where a Geiger radiation counter lay. The moment they entered the room, the Geiger counter began emitting a strange sound that they had never heard before. Engineers from all around rushed in. At first they were at a loss as to what was going on. At the insistence of the engineers, Senol Kale produced the balls in his pocket.

Almost all of these were balls of lead. One alone appeared a little different from the others. One of the engineers said later that this was the "radium isotope" that constituted the nucleus of the "Gamamat" device. And this was "the thing" that caused a red spot on Senol Kale's hand.

This was perhaps the first time that "Chernobyl" crossed the minds of some people in the Kangal District of Sivas. There was a substance in the room that was emitting radiation. The company immediately sent the five workers involved to the government hospital in Sivas. While an examination produced the verdict that there was "nothing serious," this did not allay the misgivings of the youths concerned.

Matters took a more serious turn when a relative of one of them said: "You have been contaminated with the radiation microbe. Alas, this will also kill your manhood." Fortunately, a visit to a brothel that night proved to their own satisfaction that the radiation microbe had wrought no "serious havoc" in their bodies. What, however, if the microbe had a delayed effect? The fears were still there, despite everything. And with the help of some pressure from the Sivas hospital authorities, a trip to Ankara was indicated. So, the company dispatched the five workers straight to the "Occupational Hospital" in Ankara.

As they were about to leave for Ankara, one of their relatives approached them, saying: "You should still be thankful; can you imagine what would have happened if the bomb had exploded when you dropped it? God has saved us. Otherwise the whole of Turkey could have been annihilated." Only then did the five "understand a little better the magnitude of the danger they had been in." After all, this could have created--Heaven forbid--a political problem in the Middle East and the Balkans as well. At a time like the present, when rumors to the effect that "Turkey has built an atomic bomb" have reached a peak, one could even expect Greece to raise the issue at the annual meeting of the North Atlantic Assembly due to be held in Istanbul.

The bomb, nevertheless, did not go off--nor, however, did the adventure of the five workers at the Ankara Occupational Hospital come to an end. The doctors there said that the situation was not grave. The workers have been given lapel tags to measure the amount of radiation they received earlier.

One of them has received under 1,000 millicuries of radiation, another about 1,000, and two others 5,000 millicuries each. The most junior member of the group, Senol Kale, has received around 8,000 millicuries due to having handled the "atomic balls" and having carried them in his pocket. While the doctors kept saying "there is nothing to worry about," the family of one of the five workers alerted the Atomic Energy Commission. The latter then got in touch with the company to be briefed on the situation, and advised the owner of the company to send Senol Kale to the Madame Curie Hospital in Paris.

The five young men are now hospitalized at the Ankara Occupational Hospital. The hospital has been given instructions not to let them be interviewed by journalists. Dressed in identical track suits, they look less like patients than a basketball team at a training camp. In fact, when our colleague asked to photograph them, they lined themselves up just like a basketball team posing for a souvenir photograph. Senol Kale does not know yet that he will go to Paris. The Kutlutas Company has taken the advice of the Atomic Energy Commission seriously and intends to send Senol Kale to the Madame Curie Hospital in Paris.

Up to now, Senol Kale has not shown much interest in Chernobyl. At the time the radiation clouds that formed as a result of the explosion at the nuclear power station there were skirting Turkey, he was in Sivas as usual. A teacher told him that "the situation is dangerous, but if there is no change in the wind, it will not make it to Sivas." He has had nothing to do with Chernobyl up to now. But now fate is taking him to one of the two great radiation disease hospitals in the world, the Madame Curie Hospital, where some of the worst sufferers were taken after the Chernobyl tragedy. Doctors are saying that the redness on the hand "in which he held the atomic balls" is not a serious condition. But everybody also says: "One should not fool around with atomic balls...."

13184/6662
CSO: 5100/2418

ATOMIC CENTER'S ROLE IN RADIATED MILK ISSUE DISPUTED

Istanbul DUNYA in Turkish 17 Nov 86 pp 1, 11

[Text] While Turkish hazelnut exports have been hampered on grounds of radiation, it has been claimed that radioactive powdered milk has been imported into Turkey and used.

According to officials of the Atomic Energy Center, one of the 17 consignments of powdered milk imported by Ulker Gida Sanayi A.S. on 7 October 1986 has a radiation level 3.5 times higher than the maximum set for imports.

The officials have stated that one particular consignment out of the 17 imported from the Dutch firm Arcon contains a high level of radiation; they claim that this consignment contains 822.2 becquerels per kilogram, compared with 280 becquerels per kilogram which is the maximum admissible level for imports into Turkey.

Ulker Gida Sanayi said in this connection that no such information has been communicated to them by the Atomic Energy Center and that they have used the powdered milk in question.

In the face of the Atomic Energy Center statement that "While the need not to allow radioactive merchandise into Turkey is being upheld, the fact that Ulker has used the merchandise in question shows that the latter has somehow entered Turkey." Faruk Bersan, member of the executive board of Ulker Gida Sanayi, has said the following: "Nobody told us that we should not use this merchandise. On the contrary, the chemical and bacteriological analysis results from the Hygiene Institute gave a clean bill of health to this 17-part shipment. If it had been radioactive, we would not have let it go into our packaging plant in Turkey in the first place. In view of the fact that we have let it go into our packaging plant and used it, I do not believe that there is anything to this claim."

Mehmet Barak, chairman of the Association for the Protection of Consumers, asserted that test laboratories should be set up at customs posts to inspect goods and prevent this kind of incident.

Mehmet Barak said:

"In no country in the world can one freely import any goods he wishes and put it on the market. It is essential that all goods without exception be subject to control at customs posts.

"To this end, test stations and laboratories must be established at customs centers. In addition, expert staff with sweeping powers should be employed at these centers.

"Western countries are able to place an embargo on Turkish hazelnuts on the grounds of radioactivity. This is a decision that originates in their laboratories and is designed to protect their consumers. Arab countries less industrialized than ourselves are now able to turn back some of our exports, such as flour, for instance, on grounds of having insects in it. The incidents in question have demonstrated the level of our consumer protection practices.

"The powdered milk incident that has now been exposed arouses suspicions that there may have been similar incidents in the case of many other food substances.

"There is another very important issue. Carrying out tests on a single sample has many drawbacks. On the contrary, goods that are to be brought into the country must have samples taken and be tested at laboratories to be established at customs posts by experts. To leave this task to the discretion of commercial firms lays it open to all kinds of corruption."

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